$$\frac{\theta_{i,j}^{n+\frac{1}{2}} - \theta_{i,j}^{n}}{\Delta\tau/2} = \frac{k}{h^2}\left[A_1\theta^{n+\frac{1}{2}} + A_2\theta^{n}\right]$$

$$\frac{\theta_{i,j}^{n+1} - \theta_{i,j}^{n}}{\Delta\tau/2} = \frac{k}{h^2}\left[A_2\theta^{n+1} + A_1\theta^{n+\frac{1}{2}}\right]$$

$$\alpha = \frac{\Delta\tau \cdot k}{2h^2} \qquad \boxed{\theta^{0}} \sim rv|$$

(b)

$$\underbrace{\begin{bmatrix} 1-2\alpha & -\alpha & & & \\ -\alpha & 1-2\alpha & -\alpha & & \\ & & \ddots & & \\ & & -\alpha & 1-2\alpha & -\alpha \\ & & & -\alpha & 1-2\alpha \end{bmatrix}}_{M} \begin{bmatrix} \theta_{2j}^{n+\frac{1}{2}} \\ \vdots \\ \theta_{Nj}^{n+\frac{1}{2}} \end{bmatrix}$$

$$\underbrace{\left[\begin{array}{l} \alpha\,\theta^{n}_{2,j-1} + (1-2\alpha)\,\theta^{n}_{2,j} + \theta^{n}_{2,j+1} + \alpha\,\bar{\theta}_{1} \\ \alpha\,\theta^{n}_{3,j-1} + (1+2\alpha)\,\theta^{n}_{2,j} + \theta^{n}_{2,j+1} \\ \cdots \\ \alpha\,\theta^{n}_{N,j-1} + (1+2\alpha)\,\theta^{n}_{N,j} + \theta^{n}_{N,j+1} + \alpha\,\bar{\theta}_{N+1} \end{array}\right]}_{R \;\; -\mu-}$$

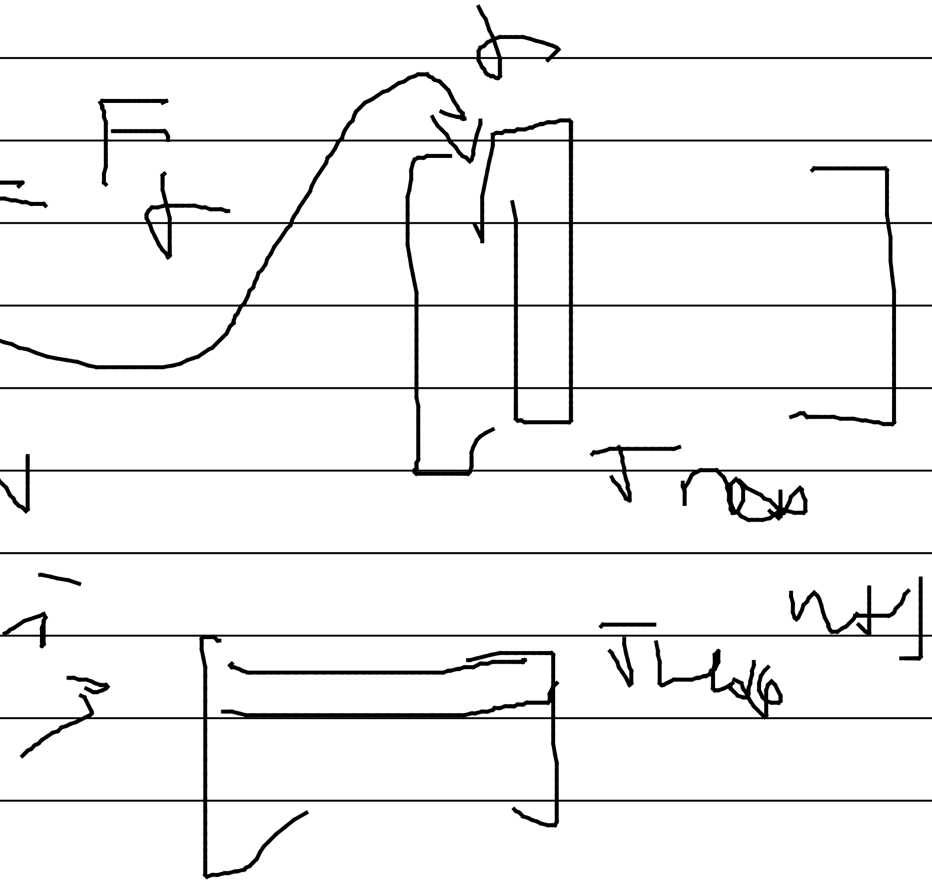
(2)

$$M \begin{pmatrix} \theta^{n+1}_{i,2} \\ \theta^{n+1}_{i,3} \\ \vdots \\ \theta^{n+1}_{i,N} \end{pmatrix} =$$

$$\underbrace{\begin{vmatrix} \alpha\theta^{n+1/2}_{i-1,2} + (1+2\alpha)\theta^{n+1/2}_{i,2} + \alpha\theta^{n+1/2}_{i+1,2} + \alpha\bar{\theta}_{i,1} \\ \alpha\theta^{n+1/2}_{i-1,3} + (1+2\alpha)\theta^{n+1/2}_{i,3} + \alpha\theta^{n+1/2}_{i+1,3} \\ i,j \\ \alpha\theta^{n+1/2}_{i-1,N} + (1+2\alpha)\theta^{n+1/2}_{i,N} + \alpha\theta^{n+1/2}_{i+1,N} + \theta_{i,N+1} \end{vmatrix}}_{Q}$$

$$M\vec{x} = F_j$$

$$j = 2 : N$$



M

K Loop Tempo ← Nt Tempo

✓ Loop j

✓ Loop i

→ O(n³)

[ ]

MLF trndi

3n−2 loo / 42

$Mx = F$

$x = M(n) : F$

$n \times n$

n^3 3n−2 [ ]